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REMARKS

In the outstanding Office Action, the following references (1) and (2) are cited.

(1) JP5-331108 (hereinafter, frequently referred to as "JP '108"); and

(2) U.S. Patent No. 3,274,214 (hereinafter, frequently referred to as "Robert '214").

JP '108 is a Japanese language patent document. Therefore, for the Examiner's convenience, the Applicants submit as Exhibit a full English translation of JP '108, which is a machine translation provided by the Japan Patent Office.

(I) Amendment to the claims

Claims 35-37 have been canceled. Claim 38 has been added. Claims 1-34 and 38 are pending and under consideration.

(II) The state of the art and the essential features and advantages of the present invention

Before specifically addressing the Examiner's rejections of the claims over the references, it is believed that the following background information should be considered in order to shed a proper light on the development of the present invention and the advantageous features thereof.

As described in the present specification under "Prior Art", there are a number of conventional methods for producing an aromatic carbonate; however, these conventional methods have various problems, such as the use of a toxic substance as a raw material; the corrosion of the production equipment due to a chlorine-containing compound; the cumbersome operation for the removal of a by-product (such as a chlorine-containing compound); and the difficulty in the conversion of a co-product to a raw material. Even when carbon dioxide (which has substantially no toxicity and contains no chlorine compound) is used as a carbonyl source, there still are problems, such as the generations of a co-product and a by-product derived from a dehydrating agent used, and the need for regeneration or disposal of a dehydrating agent.

In this situation, the present inventors have made extensive and intensive studies with a view toward solving the above-mentioned problems accompanying the prior art. As a result, it has been found that all of the problems accompanying the prior art can be solved by a method as defined in claim 1 of the present application. For easy reference, claim 1 of the present application is reproduced below:

1. A method for producing an aromatic carbonate, comprising:

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(1) performing a reaction between an organometal compound and carbon dioxide to obtain a reaction mixture containing a dialkyl carbonate formed by the reaction,

(2) separating said dialkyl carbonate from said reaction mixture to obtain a residual liquid, and

performing the following steps (3) and (4) in either order, or partially or wholly simultaneously:

(3) reacting said residual liquid with an alcohol to form at least one organometal compound and form water and removing said water from said organometal compound, and

(4) reacting said dialkyl carbonate separated in step (2) with an aromatic hydroxy compound to obtain an aromatic carbonate.

As seen from the above-reproduced claim 1, in the method of the present invention, an organometal compound is reacted with carbon dioxide to obtain a reaction mixture containing a dialkyl carbonate (see step (1)). The reaction mixture is separated into the dialkyl carbonate and a residual liquid (see step (2)), wherein the residual liquid is reacted with an alcohol to form an organometal compound and water (see step (3)), and the dialkyl carbonate is reacted with an aromatic hydroxy compound to obtain an aromatic carbonate.

It should be noted that the organometal compound formed in step (3) can be recycled to step (1). It should also be noted that the reaction (i.e., transesterification reaction) performed in step (4) between the dialkyl carbonate and the aromatic hydroxy compound produces an alcohol, which can be recycled to step (3). Therefore, in the method of the present invention, intermediate products generated during the production of the desired aromatic carbonate can be recycled, and only an aromatic carbonate and water are obtained as products from carbon dioxide and an aromatic hydroxy compound as raw materials, wherein substantially no raw material other than carbon dioxide and the aromatic hydroxy compound are necessary.

It is important to note that independent claim 1 does not recite any of the recycling steps. Instead, these recycling steps are recited in other claims. For example, claims 3, 5, 8 and new independent claim 38 specifically recite the recycling aspect of the invention.

Thus, the method of the present invention is advantageous not only in that the method does not need the use of any toxic substance and is free from the generation of any corrosive substance, but also in that the amounts of by-products are very small and intermediate products generated during the production of the aromatic carbonate can be recycled, so that the method of the present invention is favorable from the view point of protection of environment, and enables a simple and efficient production of a high purity aromatic carbonate.

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(III) Rejections over the claims over the references

The claims are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent Publication No. 5331108 ("JP '108") (see pages 4-6 of the Office Action). The claims are also rejected under 35 U.S.C. 103(a) as being unpatentable over JP '108; and JP '108 in view of U.S. Patent No. 3, 274,215 to *Prochaska* (see pages 2-4 of the Office Action).

The Applicants wish to traverse the Examiner's rejections as follows.

JP '108 discloses a method for producing an aromatic carbonate, which comprises performing a transesterification reaction of an aromatic hydroxy compound with a dialiphatic carbonate or an aliphatic aromatic carbonate in the presence of an yttrium compound and/or a thallium compound as a catalyst (see the Abstract of JP '108). The method of JP '108 is a method comprising only one step, which corresponds to step (4) of the method of the present invention.

JP '108 does not have any teaching or suggestion about steps (1), (2) and (3) of the method of the present invention. Specifically, JP '108 has no teaching or suggestion about the reaction between an organometal compound and carbon dioxide for producing a reaction mixture containing a dialkyl carbonate. Also, JP '108 does not teach or suggest the separation of the reaction mixture into the dialkyl carbonate and a residual liquid, which is used for the reaction with an alcohol to regenerate an organometal compound.

In connection with the organometal compound referred to in step (1) of the method of the present invention, the following should further be noted. Judging from the Examiner's statement that "With regard to applicants claims 12 and 13 the preferred catalyst includes yttrium alkoxides, phenoxide, chloride, acetate and acetylacetonate and thallium acetylacetonate, oxide and acetate" (see page 5, lines 13-15 of the Office Action), the Examiner seems to recognize that the organometal compound is used as a catalyst for a transesterification reaction. However, contrary to the Examiner's recognition, the organometal compound referred to in step (1) of the method of the present invention is actually used as a reagent to be reacted with carbon dioxide. If the Examiner doesn't clearly understand the invention, then certainly it would not have been obvious.

Therefore, it is apparent that JP '108 does not have any teaching or suggestion about the essential features of the method of the present invention and the effects achieved thereby.

Prochaska '214 discloses a cyclic aromatic carbonate polymer (see claims 1 and 2 of *Prochaska* '214), and a method for producing a cyclic aromatic carbonate polymer, which comprises contacting a dihydric phenol with a carbonyl halide (e.g., phosgene) in the presence

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of an acid acceptor to obtain a reaction mixture containing a cyclic aromatic carbonate polymer, and separating the cyclic aromatic carbonate polymer from the reaction mixture (see claims 3 and 4 of *Prochaska* '214).

Prochaska '214 does not have any teaching or suggestion about the essential features of the method of the present invention and the effects achieved thereby.

From the above, it is apparent that the method of claim 1 of the present application has patentability over JP '108 and *Prochaska* '214, taken alone or in combination.

Claims 2-34 are method claims depending from claim 1 directly or indirectly, and further features are incorporated in claims 2-34 as limitations to claim 1. Therefore, claims 2-34 also have patentability over JP '108 and *Prochaska* '214.

Claim 35 is directed to an aromatic carbonate produced by the method of the present invention, and claims 36-37 are directed to a polymer produced using the aromatic carbonate of claim 35. As mentioned above, claims 35-37 have been canceled.

(III) Conclusion

From the foregoing, it is firmly believed that the Examiner's rejections have been overcome. Early and favorable action is respectfully solicited.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,
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